Evaluate Status of Coastal Cutthroat Trout in the Columbia River Basin above Bonneville Dam

2001 Annual Report

June 2002

Prepared by:

Patrick J. Connolly[1]
Cameron S. Sharpe[2]
and
Sally Sauter[1]

[1] U.S. Geological Survey
Western Fisheries Research Center
Columbia River Research Laboratory
5501-A Cook-Underwood Road
Cook, WA 98605

[2] Washington Department of Fish and Wildlife
804 Allen St. #3
Kelso, WA 98626

Prepared for:

Bonneville Power Administration
Environment, Fish and Wildlife
P.O. Box 3621
Portland, OR 97208-3621

COTR: John Skidmore
Project Number: 2001-007-00
Contract Number 00005678

Introduction

The objective of this study was to provide much needed information on the current distribution and status of the portion of the coastal cutthroat trout's *Oncorhynchus clarki* range in the Gorge Province. This information is a necessary prerequisite to future recovery efforts of this candidate species for listing. We were fortunate to attain additional funds from the U.S. Fish and Wildlife Service (USFWS) to match with funds from the Bonneville Power Administration (BPA) to help us bring more resources to this project. Our project addresses a Region-wide concern that Columbia River coastal cutthroat trout are declining, and it addresses a region-wide paucity of information on this species.

This report documents what is known about coastal cutthroat trout populations in the Gorge Province. This segment of the population is of special significance because it represents the easternmost range of the species within the Columbia River Basin. It is this singular portion of the coastal cutthroat trout's range, within the SW Washington/Columbia River, that is currently being considered for listing as "threatened" under the Endangered Species Act (see: Federal Register, v 64, no. 173, 6 Sep 2001, pages 53974-53975).

Because this project encompasses all tributary systems (large and small) in the Gorge Province, it has relationships with many ongoing projects. Ongoing BPA-funded projects that are related to the proposed project include: Project 1990-33: *Document Native Trout Populations;* Project 1990-95: *Bull Trout Population Assessment in the Columbia River Gorge, WA;* Project 1993-04000: *Fifteenmile Creek Habitat Restoration Project;* Project 1994-05400: *Bull Trout Life History Project—NE Oregon;* Project 1988-05303: *Hood River Production Program;* Project 1992-04101: *Fish Passage Evaluations-Lower Columbia River;* Project 1988-12000: *Yakima Natural Production and Enhancement Program;* Project 1998-01900: *Wind River Watershed*; Project 2001-02500: *Assess current and potential salmonid production in Rattlesnake Creek associated with restoration efforts*. During the review period of our original proposal submitted for FY2001 funding, members of the Independent Science Review Panel (ISRP) were aware that widespread fisheries projects were ongoing in the Gorge Province, and they questioned if current levels and types of ongoing assessments were adequate to cover the information needs on cutthroat trout populations in the Gorge Province. The ISRP was concerned about duplication among ongoing fish assessment efforts by disparate entities, especially those across state boundaries. Along with a preliminary report submitted in February 2002, this report fulfills a request by the ISRP to submit our findings, including an assessment of data and monitoring gaps, to determine justification for full funding for the two additional years left in the funding cycle for the Gorge Province (i.e., FY 2002 and 2003).

Study Area

Our study was confined to the Gorge Province of the Columbia River Basin and included all tributaries that drain into the Columbia River between Bonneville and The Dalles dams (Figure 1). Impoundment of the mainstem Columbia River by Bonneville Dam (constructed in the late 1930s) stretches 46 miles to The Dalles Dam. The study area consists of six primary watersheds (Table 1) and numerous small tributaries to the Columbia River. Two of the largest tributaries in the study area, the Hood and White Salmon rivers, are blocked by hydroelectric dams. Returning anadromous fish are trapped and transported around the Hood River's Powerdale Dam. No passage is provided around Condit Dam, which has blocked anadromous fish passage up the White Salmon River since its construction in 1913. Larger tributaries such as the Wind, Little White Salmon, and Klickitat rivers have waterfalls a short distance above the mainstem Columbia River (Table 1) that block or impede upstream migration, especially during periods of high flow. Many of the larger tributaries are glacier-fed from Mt. Hood and Mt. Adams, which likely have a cooling effect on the mainstem Columbia River during the summer and fall. The study area has much heterogeneity in its geomorphology, elevation, and vegetation. The western end of the study area receives high rainfall and is heavily timbered, while the eastern portion is arid and much more open. The Gorge Province encompasses the most inland distribution of coastal cutthroat trout range within the Columbia River basin.

Methods

Extensive contacts were made by project personnel to document the professional knowledge and existing data on coastal cutthroat trout in the mainstem and tributaries of the Columbia River between Bonneville and The Dalles dams. Information was collected through interviews and through review of published and unpublished surveys, reports, and archives. Prior to conducting interviews, we prepared a 1:62,500 scale topographic map for each watershed. Each map was faced with a clear mylar cover.

Interviews were conducted with biologists from the Oregon and Washington departments of Fish and Wildlife (ODFW, WDFW), the U.S. Forest Service (USFS), and the Yakama Nation (YN) to record their professional knowledge of coastal cutthroat trout populations in tributaries between Bonneville and The Dalles dams. A typical interview began with the biologist listing streams where coastal cutthroat trout occurred and marking the extent of cutthroat trout distribution for each stream on the mylar map cover. The mapping exercise created a spatial representation of probable cutthroat trout habitat by incorporating each biologist's documented sightings of cutthroat trout with their professional knowledge of the aquatic habitat quality and quantity in sections of a stream. Stream sections where some uncertainty existed in the accessibility of the habitat to cutthroat trout were marked with dashed lines and classified as suitable habitat. Knowledge of barriers, such as waterfalls and diversions, as well as the location of juvenile migrant traps and other incidental information were also noted on the maps. We

recorded stream names listed by agency biologists and noted any additional information communicated during the mapping exercise.

The oral questionnaire portion of the interview was conducted after coastal cutthroat trout streams were listed and mapped by watershed. Interview questions covered historic and current use of streams by coastal cutthroat trout. Response categories for historic and current use were: a) documented-use, b) documented-no use, c) professional judgment-use, d) professional judgment-no use, and e) unknown. Professional knowledge of the historic and current life history stages present and population abundance was also recorded. Population abundance categories of responses were graded as "high", "average", or "low", in addition to "unknown". Additional questions explored professional knowledge of the current population status, limiting factors, and other fishes present for each stream.

A review of published and unpublished scientific data completed each watershed-specific investigation of coastal cutthroat trout distribution. The information reviewed included stream and aquatic surveys, subbasin plans, restoration plans, state and federal agency reports, StreamNet documentation, historic stocking records, and unpublished data. Unpublished data from field surveys corroborated and augmented the information provided by professional biologists during the oral interviews. Review of unpublished data provided detailed information on the date and time, sampling techniques, number and size of cutthroat trout, locations, and environmental conditions encountered during aquatic surveys. Corroborative field records and reports produced since 1980 were accepted as "current" data. Additional corroborative and incidental information was collected from fish biologist and managers from the Confederated Tribes of Warms Springs of Oregon and the USFWS as well as from professional fishing guides and sport anglers.

We compiled and organized the information collected from each professional contact into datasets. These compiled datasets were combined for each watershed and the data sorted by state and stream order. A few streams were listed several times during interviews; multiple stream listings were removed by accepting documented data over professional judgment data. Interview response categories were assigned ordinal level rankings for graphic presentation of the data.

Results

We conducted extensive interviews with most if not all of the Columbia Gorge's professional management fish biologists, including representatives from USFS, ODFW, WDFW, and YN (Table 2). Corroborative and anecdotal information was collected through numerous contacts with professional fishing guides, anglers, and long-term residents. Information was obtained on the six primary watersheds (Table 1) as well as the numerous smaller tributary systems, including Rock, Dog, and Jewett creeks in Washington, and Viento, Phelps, Rock, Mosier, Mill and Threemile creeks in Oregon.

Fish assemblages in the study area watersheds are primarily native cold-water fishes, including various mixes of cutthroat trout, rainbow trout *O. mykiss*, sculpin *Cottus* spp., and, to a lesser degree, bull trout *Salvelinus confluentus* (Table 1). Other native fishes, most often at lower elevations, include species of mountain whitefish *Prosopium williamsoni*, lamprey *Lampetra* spp., northern pikeminnow *Ptychocheilus oregonensis*, sucker *Catostomus* spp. and dace *Rhinichthys* spp. Streams with adequate upstream passage also may support natural and/or hatchery runs, in highly variable strengths, of anadromous chinook salmon *O. tshawytscha*, steelhead *O. mykiss*, coho salmon *O. kisutch*, and sea-run coastal cutthroat trout. Brook trout *S. fontinalis*, an introduced species, are present in numerous streams in the upper portions of watersheds.

Historical distribution

Inadequate records exist to reconstruct the historical distribution of coastal cutthroat trout in the Gorge Province. A complicating factor is the large amount of hatchery plants of cutthroat trout that occurred in the 1930s through the 1980s (see below). One striking glimpse at the former prominence of cutthroat trout above Bonneville Dam is provided by Bradner (1950) writing about the Wind River: "During the month of September, the harvest trout will come into the head of the pool, and lie there just below the rapids. When the sun leaves the water one can get out onto its quiet surface and successfully entice the cutthroats into hitting". Bradner gives an account of a fishing day on Labor Day 1945 on the lower Wind River, whereby he landed three cutthroat trout averaging 2 pounds each. From our extensive interviews, it appears likely that a sea-run cutthroat trout has not been caught in the Wind River during the past 15 years or more.

Current distribution and status

There is good evidence from juvenile migrant traps (Appendix Table 1) and aquatic surveys that coastal cutthroat trout populations extend east as far as the Fifteenmile Creek watershed in Oregon (Figure 2). On the Washington side, Jewett Creek is the easternmost stream with a documented cutthroat trout population (Figure 3). The Major Creek watershed, which is 8 miles east of Jewett Creek, has not been surveyed. Reports by local anglers suggest coastal cutthroat trout once were and may still be present in the Klickitat River. An angler reported catching coastal cutthroat trout during the winter months for several years in the late 1990s near the confluence of Swale Creek with the Klickitat River. However, no cutthroat trout have been recovered in the Yakama Nation juvenile migrant traps during 1997-2001 (Appendix Table 1), and an extensive telephone survey of local anglers and professional guides who regularly fish the Klickitat River failed to corroborate the Swale Creek report. Yakama Nation fishery biologists report westslope cutthroat trout in the Klickitat and Little Klickitat River headwaters (Pers. com with Bill Sharp and Jim Matthews, August 2001). Many of the numerous small tributaries between Bonneville and The Dalles dams that drain directly

into the Columbia River are generally thought likely to support coastal cutthroat trout populations, although very few of these streams have been surveyed.

Our interviews recorded 89 streams in Washington and Oregon above Bonneville Dam where cutthroat trout populations have been documented during aquatic surveys since 1980 (Table 3). Of those streams, 74 were small streams (third order or smaller) and 15 were large (forth order or larger). Professional fishery biologists listed cutthroat trout abundance as low in 13, moderate in 8, and high in 4 streams with documented presence. Population status was listed as stable in 6 and declining in 17 of these streams. The abundance and status of cutthroat trout populations was listed as unknown in 64 streams. Professional fishery biologists listed another 16 streams that had not been surveyed as potentially supporting cutthroat trout populations. Although cutthroat trout populations are currently known to exist in tributaries and the mainstem Columbia River above Bonneville Dam, there is a paucity of information about the abundance and status of these populations.

Most streams documented to support cutthroat trout were in Oregon, with the Hood River watershed accounting for 49 (55%) of the total streams (Table 3, Figure 2). There is more uncertainty about the distribution and abundance of coastal cutthroat trout populations on the Washington side of the study area. Seven mainstem tributaries to the Columbia River on the Washington side have documented cutthroat trout populations. Many of the larger Washington watersheds may be inaccessible to anadromous coastal cutthroat trout because of stream barriers. Shipherd Falls on the Wind River may block upstream passage of coastal cutthroat trout at river mile (RM) 2.0, and Condit Dam, at RM 3.3 on the White Salmon River, blocks upstream passage of all anadromous salmonids (Table 2). However, cutthroat trout have been documented above barriers on the Wind, Little White Salmon, and White Salmon rivers by professional fishery biologists (Figure 3).

Based on adult trap records that extend back to 1962 at Powerdale Dam on the Hood River, there has been a large decline in numbers of adult sea-run cutthroat trout returning to the Hood River subbasin in the last 10 to 20 years (Appendix Table 2). However, it is not known how dependent the past runs were on hatchery outplants, a program that ceased in 1988 (Table 4).

Genetic analyses

Genetic sampling of trout in the Hood River, Fifteenmile, and White Salmon subbasins confirms the presence of populations of pure coastal cutthroat trout as well as coastal cutthroat/rainbow trout hybrids (Table 5). An understanding of the genetic population structure of coastal cutthroat trout in the region is much less clear because of sparse data and, importantly, lack of a systematic sampling and an analytical regimen.

We reviewed the results of past and ongoing genetic analyses conducted on cutthroat trout in the Gorge Province. The work collectively spans approximately one

decade starting with a collaboration between ODFW and the University of Montana, continuing with work by National Marine Fisheries Service (NMFS) related to their efforts at integrating genetic analyses into a cutthroat trout status determination, and, finally, current efforts to synthesize historical data (USFWS) and obtain new information (USFWS, WDFW, ODFW, USFS, and U.S. Geological Survey's Columbia River Research Laboratory [USGS-CRRL]).

At the University of Montana, Gregg and Allendorf (1995) examined trout populations, including cutthroat, in the Hood River basin and surrounding areas (19 populations) using allozyme electrophoresis and meristic analyses. They found populations of pure coastal cutthroat trout, pure rainbow trout, and hybrids. In an extension of that work, Spruell et al. (1998) in collaboration with ODFW, surveyed Lower Columbia and Columbia Gorge trout populations, again including cutthroat trout, using DNA-based analyses. The DNA-based work again revealed populations of pure cutthroat and rainbow trout as well as relatively common hybrids. An attempt to use the DNA technology to characterize genetic population structure of cutthroat trout in the region is ongoing.

The NMFS sampled cutthroat trout from Mill Creek of the White Salmon subbasin as part of an effort to supplement the genetic information used for the coastal cutthroat trout status review (Johnson et. al 1999). The allozyme-based genetic analyses suggested that the White Salmon cutthroat trout were relatively similar to cutthroat trout in the Washougal subbasin but, collectively, the White Salmon/Washougal River cutthroat trout were genetically distinct from cutthroat trout elsewhere in the lower Columbia. However, the USFWS is reexamining those data and have cautioned that the appearance of distinct differences between the White Salmon/Washougal and other populations may be an artifact because at least the Mill Creek population appears to represent a cutthroat/rainbow trout hybrid swarm (pers. comm., Don Campton, USFWS).

The USGS-CRRL, in collaboration with USFS, sampled cutthroat trout from the White Salmon watershed while conducting work targeted at rainbow trout. Samples of DNA from those specimens have been sent off for DNA-based analysis. Those analyses are underway.

A recurrent genetic issue in all of the historical and ongoing genetic work is the prevalence of hybridization between cutthroat and rainbow trout. Although a few isolated populations appear to be pure coastal cutthroat trout, the majority of samples included some, often many, hybrids. To our knowledge, none of the past and ongoing genetic analyses have explored the potential for introgression between endemic coastal cutthroat trout and the non-local origin coastal and westslope cutthroat trout used extensively in the region for hatchery planting (below).

Hatchery cutthroat trout plants

Stocking of cutthroat trout in the Gorge Province dates to the 1930s but details on the earliest plants are sparse at best. For example, in Oregon within the Gorge Province, nothing is known about cutthroat trout plants into Mosier Creek between 1934 and 1938 except that the plants occurred. In Washington, relatively more detailed records are available, but because of the elapsed time and complexity of hatchery planting activities, the existing records are likely incomplete. Also problematic is the lack of detailed information on the origins of hatchery broodstocks. Crawford (1979) provides a considerable body of information on the origin and history of trout broodstocks developed and used by the state of Washington. We were unable to obtain comparable information on hatchery broodstock origins in Oregon. Such information likely exists but to our knowledge has not been compiled in an accessible form (Pers. comm., Kathryn Kostow, ODFW). Little information is available on federal facilities and hatcheries operated by county governments. Table 4 provides a summary of known cutthroat trout hatchery plants to date. Briefly, plants of westslope cutthroat trout ("Montana blackspotted trout") as fry dominated hatchery operations in the 1930s through the 1950s. The potential for those fish to have successfully reared and reproduced naturally is unknown, as is the likelihood for introgression between westslope and endemic coastal forms. Still, the frequent and widespread fry plants as well as early plants of parr and adult-sized westslope, suggest the possibility of introgression in some areas. Beginning in the late 1950s and early 1960s, hatchery broodstocks using coastal cutthroat trout of diverse geographic origins were developed in Oregon and Washington and fisheries management agencies began planting those stocks in the Columbia Gorge. For example, in the Hood River watershed from 1985 through 1988, over 57,000 Big Creek Hatchery stock of adult-sized cutthroat trout were planted into Neal Creek and East Fork Hood River. The incidence of introgression from these non-endemic, mixed origin stocks is unknown, but does seem likely.

Current monitoring activities

Ongoing stream survey efforts are taking place in several watersheds in the Gorge Province: in the Hood River by USFS; the Wind River by USGS, USFS, and WDFW; the White Salmon River by USGS and USFS; and the Klickitat River by YN (Table 4). However, most of these efforts target areas below anadromous fish barriers and miss the smaller tributaries (above and below barriers) important to cutthroat trout. In addition, surveys for bull trout throughout the Gorge Province by WDFW and USFWS have mainly focused on waters with habitat conditions required by bull trout, not cutthroat trout.

Recent catches from juvenile migrant traps in the Hood River, lower Wind River, and Fifteenmile Creek confirm that some cutthroat trout (parr and juvenile migrants) emigrate from these subbasins, but numbers caught are very low and trap efficiencies for this non-target species are unknown. No cutthroat trout have been detected in traps in the Little White Salmon River and Klickitat River (Appendix Table 1).

Returning sea-run adult cutthroat trout have been detected at the Hood River's Powerdale Dam adult trap (Appendix Table 2) and at the Bonneville Dam adult fish facility (Appendix Table 3). Because cutthroat trout are not systematically counted or sampled at Bonneville Dam like some species (salmon, steelhead, American shad), status and trend cannot be determined from these detections. No cutthroat trout have been detected at the two adult traps in the Wind River watershed at Shipherd Falls (RKM 2.0 of the Wind River) and Hemlock Dam (RKM 2.0 of Trout Creek), which have been in operation since 1999 and 1992, respectively (Rawding and Cochran 2001).

Discussion

Existing monitoring activities primarily target other salmonid species, and they are inadequate to access changes in abundance or status of coastal cutthroat trout in the Gorge Province. Much of the current distribution patterns are based on professional judgment rather than known presence. It is clear that little is known about the distribution of coastal cutthroat trout in the Gorge Province, with the exception of the Hood River watershed. But even in the Hood River watershed, there are many streams that have not been sampled for cutthroat trout, and the sampling that has been done has often been too infrequent and too long ago.

Because past efforts lack a systematic sampling plan and an adequate sampling intensity, a determination of population status could not possibly be derived at this time. Based on our compilation of highly piecemeal data from state, federal, tribal, and private sources, the abundance and status of sea-run adult returns and tributary populations of coastal cutthroat trout are largely unknown in subbasins throughout the Gorge Province. It follows that there would be no possibility of detecting a change in the population trend with the current data and level of monitoring effort.

Clearly, a need exists to: 1) survey existing cutthroat trout populations in the Gorge Province, 2) locate populations with little or no evidence of hybridization with hatchery steelhead or rainbow trout, 3) ascertain the likelihood of introgression of endemic cutthroat trout with hatchery origin cutthroat trout (coastal and westslope forms), and 4) determine the genetic relationship between endemic coastal cutthroat trout and populations elsewhere in the region.

To that end, because we found that the distribution of coastal cutthroat trout above Bonneville Dam is poorly documented and the current monitoring efforts are insufficient to allow determination of population status (i.e., increasing, stable, or decreasing), additional work is justified to address the second objective as stated in the original proposal, which was:

> "Determine status of naturally reproducing populations of coastal cutthroat trout above Bonneville Dam".

The tasks associated with this objective include:

Task a. Conduct an extensive survey of streams in the Columbia River basin above Bonneville Dam to determine presence and status of cutthroat trout.
Task b. Conduct intensive habitat and population surveys in 4-6 streams.
Task c. Perform laboratory analysis of scale, otolith, and tissue samples.

Preliminary investigation of coastal cutthroat trout populations in the Gorge Province suggests concerns about a population decline are well founded. Our interviews with professional fishery biologists indicate that cutthroat trout have been encountered during aquatic surveys through much of the Gorge Province, but that very little is known about the abundance, genetic disposition, and status of these populations. Fishery biologists frequently cited habitat alteration, barriers, hatchery stocking, and competition with introduced salmonids as limiting factors for cutthroat trout populations in the study area. Sea-run coastal cutthroat trout may be most affected by these limiting factors. The numbers of returning sea-run cutthroat trout at Bonneville and Powerdale dams, as well as collections from juvenile migrant traps, support the contention that this life history form is disappearing or much depressed above Bonneville Dam.

Acknowledgements

Numerous state, tribal, and federal fishery biologists contributed their professional knowledge and data to this body of work. They are: Steve Pribyl and Rod French of ODFW; John Weinheimer, Dan Rawding, and Gil Lensegrav of WDFW; Betsy Scott, Gary Asbridge, Chuti Fiedler, and Ken Wieman of USFS; and Bill Sharp and Jim Matthews of YN. Charlie Cochran (WDFW), Carl Dugger (WDNR), and Tom Linde (USFS) provided corroborative information and documentation. Kyle Martens and Joel Quenette, USGS-CRRL, assisted with data compilation. Tom Batt and Jim Hatten, USGS-CRRL, provided their expertise with the GIS mapping effort. We would also like to thank John Skidmore of BPA for his work as Contracting Officer for the project.

References

Bradner, E. 1950. Northwest Angling. Binfords and Mort, Portland, OR. 239 p.

Crawford B. A. 1979. The origin and history of the trout brood stocks of the Washington Department of Game. WDG Fishery Research Report. 90 pp.

Gregg, R., and F. Allendorf. 1995. Systematics of *Oncorhynchus* species in the vicinity of Mt. Hood. Preliminary report to Oregon Department of Fish and Wildlife, December 31, 1995.

Johnson, O., and seven co-authors. 1999. Status review of coastal cutthroat trout from Washington, Oregon, and California. NMFS Technical Memorandum NMFS-NWFSC-37.

Olsen, E. A., and R. French. 2000. Hood River and Pelton Ladder Evaluation Studies. Annual report to Bonneville Power Administration. Project number 88-053-04.

Rawding, D., and P. C. Cochran. 2001. Adult steelhead monitoring in the Wind River, 1999-2001. Report F. *In* P.J. Connolly, editor. Wind River Watershed Restoration. Annual Report. Provided to: Bonneville Power Administration. Project Number 1998-019-01.

Spruell, P., J. W. Smithwick, K. L. Knudsen, and F. W. Allendorf. 1998. Genetic analysis of rainbow and cutthroat trout from the lower Columbia River. Progress report to Oregon Department of Fish and Wildlife, December 14, 1998.

Table 1. Descriptors of the six primary tributary watersheds that feed Bonneville Pool of the Columbia River. The physical information was largely gleaned from subbasin summary reports available on Columbia Fish and Wildlife Authority's website (www.cbfwa.gov), whereas the species distribution information was compiled from interviews with regional fishery biologists. RKM = river kilometer.

Tributary (State)	Watershed size (km^2)	Highest elevation (m)	Columbia River entry (RKM)	First barrier (RKM)	Passage at first barrier	Fish species above barrier[a]
Fifteenmile Creek (OR)	966	1,952	309	Seufert Falls (0.4)	Ladder[b]	CCT, REBT, RABT, SPCH, WIST, BRKT, PLY, COT, NPM
Klickitat River (WA)	3,497	3,658	290	Lyle Falls (3.5)	Natural, w/ modification[d]	CCT[c], RABT, SPCH, [FACH], SUCH, [COHO], SUST, WIST, *BULL*, [BRKT], PLY
Hood River (OR)	1,248	3,426	272	Powerdale Dam (7.2)	Ladder	CCT, SPCH[e], FACH, COHO, *SUST*, *WIST*, PLY, *BULL*
White Salmon (WA)	1,000	2,286	270	Condit Dam (5.3)	None	CCT, RABT, COT, [*BULL*] [BRKT]
Little W. Salmon (WA)	350	1,615	261	Spirit Falls (3.2)	None	CCT, RABT, COT, [BRKT], [COHO][f]
Wind River (WA)	583	1,189	249	Shipherd Falls (3.2)	Natural, w/ ladder in 1958	(CCT), RABT, *WIST, SUST*, [SPCH], COT, [BRKT], MWF

[a] WIST = winter steelhead; SUST = Summer Steelhead; SPCH = spring chinook; SUCH = summer chinook; FACH = fall chinook; PLY = Pacific lamprey; RABT = rainbow trout; REBT = redband trout; BRKT = brook trout; CCT = coastal cutthroat trout; COT = cottid; BULL = bull trout; NPM = northern pikeminnow; MWF = mountain whitefish; ( ) = extirpated; [ ] = introduced; *italicized* = listed as threatened or endangered under ESA.

[b] Fish passage was improved at Seufert Falls by ODFW in the 1960s with installation of wooden sills which were blown out by floods in 1964. Seufert Dam was breached in 1975, and in the mid 1980s, a ladder was constructed by local sportsmen.

[c] Presence of CCT has not been documented by biologists, but an informed angler has reported catching adult sea-run cutthroat trout near the mouth of Swale Creek.

[d] Prior to passage improvement at Lyle Falls in 1952, fall chinook and coho were unable to access Klickitat subbasin above the falls.

[e] Hood River native SPCH became extinct in the 1960s. Deschutes and Hood River stock are being used to restore SPCH runs.

[f] Although adult anadromous fish cannot pass above Spirit Falls on the Little White Salmon River, annual outplants of coho smolts from USFWS's Willard National Fish Hatchery occur above the falls .

Table 2. List of contacts made to assess distribution and status of coastal cutthroat trout in the Gorge Province of the Columbia River Basin by watershed.

Watershed	Entity	Contact	Position
Hood River, OR	USFS[a]	Gary Asbridge	Zone Fisheries Biologist
	USFS	Chuti Fiedler	Fisheries Biologist
	ODFW[b]	Steve Pribyl	District Biologist
	ODFW	Rod French	Habitat Biologist
	CTWS[c]	Mick Jennings	Fisheries Biologist
Fifteenmile Creek, OR	ODFW	Steve Pribyl	District Biologist
	ODFW	Rod French	Habitat Biologist
Other small Oregon subbasins	USFS	Gary Asbridge	Zone Fisheries Biologist
	CGNSA[d]	Rich Larson	Biologist
	ODFW	Steve Pribyl	District Biologist
	ODFW	Rod French	Habitat Biologist
Wind River, WA	USGS[e]	Patrick Connolly	Research Fishery Biologist
	WDFW[f]	Dan Rawding	Fisheries Biologist
	WDFW	John Weinheimer	Fisheries Biologist
	WDFW	Charlie Cochran	Fisheries Biologist
Little White Salmon River, WA	USGS	Lisa Weitzel	Fisheries Biologist
	USGS	Steve Rubin	Fisheries Biologist
	WDFW	Dan Rawding	Fisheries Biologist
	WDFW	John Weinheimer	Fisheries Biologist
	WDFW	Charlie Cochran	Fisheries Biologist
	USFS	Betsy Scott	Fisheries Biologist
White Salmon River, WA	USGS	Patrick Connolly	Research Fishery Biologist
	WDFW	Dan Rawding	Fisheries Biologist
	WDFW	John Weinheimer	Fisheries Biologist
	WDFW	Charlie Cochran	Fisheries Biologist
	USFS	Betsy Scott	Fisheries Biologist
	USFS	Ken Wieman	Fisheries Biologist
Klickitat River, WA	WDFW	Dan Rawding	Fisheries Biologist
	WDFW	John Weinheimer	Fisheries Biologist
	WDFW	Charlie Cochran	Fisheries Biologist
	YN[g]	Jim Matthews	Fisheries Biologist
	YN	Bill Sharp	Fisheries Biologist
	public	Buzz Ramsey	professional angler Luhr Jensen
	public	Jim Bell	angler
	public	Tracy Zoller	outfitter/fishing guide
Other small Washington subbasins	WDFW	Dan Rawding	Fisheries Biologist
	WDFW	John Weinheimer	Fisheries Biologist
	WDFW	Charlie Cochran	Fisheries Biologist
	WDFW	Carl Dugger	Habitat Biologist
	public	Tom Linde	angler

Abbreviations:
[a]United States Forest Service
[b]Oregon Department of Fish and Wildlife
[c]Confederated Tribes of Warms Springs of Oregon
[d]Columbia River Gorge National Scenic Area
[e]U.S. Geological Survey-Biological Resources Division
[f]Washington Department of Fish and Wildlife
[g]Yakama Nation

Table 3. Number of streams in Columbia River Gorge study area with documented coastal cutthroat trout populations and those with suitable habitat but no documentation of coastal cutthroat trout as determined during oral interviews with professional fishery biologists. Streams are separated into ≤ 3rd and ≥ 4th order within watersheds.

Location	Documented	Suitable habitat
Oregon watersheds		
Hood River		
≤ 3rd order	44	5
≥ 4th order	5	1
Total	*49*	*6*
Other watersheds (n = 24)		
≤ 3rd order	15	none listed
≥ 4th order	5	4
Total	*20*	*4*
Washington watersheds:		
White Salmon River		
≤ 3rd order	8	1
≥ 4th order	1	none listed
Total	*9*	*1*
Little White Salmon River		
≤ 3rd order	4	none listed
≥ 4th order	none listed	none listed
Total	*4*	*none listed*
Other watersheds (n = 12)		
≤ 3rd order	3	4
≥ 4th order	4	1
Total	*7*	*5*
Grand Total	**89**	**16**

Table 4. Historical records of known cutthroat trout plants into Oregon and Washington waters within the Gorge Province in the Columbia River Basin. Data are almost certainly incomplete. Records are sparse, frequently cryptic, and do not include data on plants from (anecdotally operating) private and county hatcheries in the area. Evidence for U.S. Forest Service plants into Oregon waters is still being sought. Data for "Number planted" are pooled within watersheds, across life history stages, and across years. "Cutthroat type" (Westslope vs. Coastal) and "Stock source" were, in some cases, inferred (when not explicitly stated in the original record) based on known broodstocks in use in the originating hatchery (source) at the time of the plant. Plants into lakes without a distinct outflow and access to anadromous waters were very common, but are not included below.

Watershed	Years	Life stage(s) planted	Number planted	Cutthroat type	Stock source	Data sources
Washington						
Wind R.	1933, 1934, 1936, 1937, 1939, 1941, 1946, 1948, 1949, 1952, 1970	1939 & 1946-1949: Parr Other Years: Fry	386,743	1933-1952: Westslope 1970: Coastal	1933-1937: Skamania 1939-1952: Vancouver 1941: Tyee 1970: Mossyrock	WDFW Records USFS Archive
Rock Cr.	1949, 1963, 1972, 1973, 1989	1949: Parr 1963-1973: Fry 1989: Smolt	10,352	1949-1963: Westslope 1972-1989: Coastal	1949: Vancouver 1963: Yakima 1972-1973: Tokul 1989: Skamania	WDFW Records USFS Archive
White Salmon R.	1936, 1938-1941, 1966, 1967	Fry	233,880	1936-1941: Westslope 1966-1967: Unknown (prob. coastal)	1936: Skamania 1938: Vancouver 1939: Carson 1940: Tyee 1941: Underwood 1966-1967: Vancouver	WDFW Records USFS Archive
L. White Salmon R.	1952	Fry	14,105	Westslope	Vancouver	WDFW Records USFS Archive
Klickitat R.	1937, 1962, 1964, 1966, 1968, 1979	1966: Smolt Other Years: Fry	40,380	1966: Coastal Other Years: Westslope	1937: Skamania 1962-1979: Yakima 1966 (Smolt): Vancouver	WDFW Records USFS Archive
Oregon						
Hood R.	1956, 1974-1976, 1978, 1985-1988	1956: Parr 1974-1978: Fry 1978: Smolts 1985-1988: Adults	193,796	1956: Unknown 1974-1988: Coastal	1956: Unknown 1974: Nestucca 1975-1978: Alsea 1985-1988: Big Cr.	Steve Pribyl, ODFW, Pers. Comm. StreamNet USFS
Mosier Cr.	1934-1938	Unknown	Unknown	Unknown	Unknown	Steve Pribyl, ODFW, Pers. Comm

Table 5. Current status of genetic characterization of cutthroat trout populations in the Gorge Province of the Columbia River Basin.

Subbasin Stream	Year sampled	N	Analysis method	Results (n)	Reference
Hood River, OR					
Pinnacle	1993	30	allozyme electrophoresis	Pure coastal cutthroat with some evidence of introgression with rainbow trout	1
	1994	30	PCR[a] with electrophoresis	Pure coastal cutthroat trout	2
Dog River	1993	29	allozyme electrophoresis	Pure coastal cutthroat trout	1
lower	1994	18	PCR with electrophoresis	Pure coastal cutthroat trout (6), pure rainbow trout (8), cutthroat/rainbow hybrids (4)	2
upper	1994	24	PCR with electrophoresis	Pure coastal cutthroat trout (21), cutthroat/rainbow hybrids (3)	2
Emile	1993	30	allozyme electrophoresis	Pure coastal cutthroat trout	1
	1994	5	PCR with electrophoresis	Pure coastal cutthroat trout	2
Robinhood	1993	35	allozyme electrophoresis	Pure coastal cutthroat trout	1
	1994	49	PCR with electrophoresis	Pure coastal cutthroat trout (46), cutthroat/rainbow hybrids (3)	2
Pocket	1993	60	allozyme electrophoresis	Pure coastal cutthroat trout	1
	1994	46	PCR with electrophoresis	Pure coastal cutthroat trout (46), cutthroat/rainbow hybrids (1)	2
Bucket	1993	26	allozyme electrophoresis	Pure coastal cutthroat trout	1
	1994	30	PCR with electrophoresis	Pure coastal cutthroat trout (30)	2
Tony/Bear	1994	11	PCR with electrophoresis	Pure coastal cutthroat trout (7), cutthroat/rainbow hybrids (4)	2
Rimrock	1994	20	PCR with electrophoresis	Pure coastal cutthroat trout (20)	2
Fivemile Creek, OR					
North Fork	1993	30	allozyme electrophoresis	Pure coastal cutthroat trout	1
North Fork	1994	30	PCR with electrophoresis	Pure coastal cutthroat trout (25), cutthroat/rainbow hybrids (5)	2
Mill Creek, OR					
mainstem	1993	30	allozyme electrophoresis	Rainbow trout introgressed with cutthroat trout	1
mainstem	1994	30	PCR with electrophoresis	Rainbow trout (18), pure coastal cutthroat (1), & cutthroat/rainbow hybrids (11)	2
White Salmon R., WA					
Mill Creek	2000	16	allozyme electrophoresis	Cutthroat and cutthroat/rainbow hybrids	3

References

[1]Gregg and Allendorf (1995).
[2]Spruell et al. (1998).
[3]Orlay Johnson, NMFS, Pers. Comm., 9 August 2000. Copy of memo for Robin Waples referencing integration of 16 new cutthroat collections from Lower Columbia into analysis for cutthroat status determination. 8 pp.

Table 6. Preliminary assessments of presence and rankings of recent information and monitoring efforts for coastal cutthroat trout in the Columbia River Basin above Bonneville Dam, based on current information that we had available.

State Subbasin	Presence (documentation)	Current monitoring efforts and methods	Adequacy of recent efforts to document: Current distribution	 Change in population
Oregon				
Hood River	present (good documentation)	migrant traps (annually) stream surveys (sporadic) adult trap (ongoing) bull trout surveys (annual)	fair	poor
Fifteenmile Creek	present (good documentation)	migrant trap (1998 – 2000) no regular surveys	poor	poor
Other small subbasins	largely unknown	no traps; no regular surveys	poor	poor
Washington				
Wind River	uncertain above Shipherd Falls (fair documentation)	migrant traps (annually) adult traps (ongoing) stream surveys (ongoing, but isolated)	poor	poor
Little White Salmon R.	uncertain above Spirit Falls (fair documentation)	migrant trap (1997-98; 2000-01) no regular surveys	poor	poor
White Salmon River	present (good documentation)	stream surveys (ongoing, but isolated) passive PIT-tag detector	poor (fair in Rattlesnake Cr.)	poor (fair in Rattlesnake Cr.)
Klickitat River	uncertain (fair documentation)	migrant traps (annually) stream surveys (sporadic)	poor	poor
Other small subbasins	largely unknown	no traps; no regular surveys	poor	poor

Appendix Table 1. Annual counts of cutthroat trout collected in downstream migrant (screw) traps in tributaries of the Gorge Province in the Columbia River Basin. No cutthroat trout were detected by the USGS trap in the Little White Salmon River or the Yakama Nation Fisheries traps in the Klickitat River.

Trap location	RKM	Year(s) operated	No. cutthroat	Comments
Wind River, WA[1]	1.0	1997	1	
	1.0	1998	0	
	1.0	1999	0	
	1.0	2000	2	some fish show mixed phenotypic pattern: short maxillary
	1.0	2001	2	one of these fish was brightly smolted
Little White Salmon, WA[2]				
Trap 1		1997/1998	0	
		2000/2001	0	
Trap 2		1997/1998	0	
		2000/2001	0	
Klickitat River, WA[3]				
Trap 1	5	1997 - 2001	0	
Trap 2	43	1997 - 2001	0	
Trap 3	68	unknown	0	seasonal operation: from June - November
Hood River, OR[4]				
mainstem trap		1994	2	
		1995	6	
		1996	14	
		1997	14	
		1998	18	
		1999	14	
West Fork trap		1994	1	
		1995	0	
		1996	1	
		1997	0	
		1998	0	
		1999	0	
Middle Fork trap		1995	1	
		1996	4	
		1997	1	
		1998	5	
		1999	3	
East Fork trap		1994	14	
		1995	6	
		1996	6	
		1997	3	
		1998	20	
		1999	13	
Fifteenmile Creek, OR[4]	0.5	1998	6	sampling period: Mar 10-Jul 28, 1998
	0.5	1999	14	sampling period: Mar 16-Aug 10; Oct 19-Dec 11, 1999
	0.5	2000	17	sampling period: Feb 11-Jun 30, 2000

References (all personal communications):

[1]Charlie Cochran, Washington Department of Fish and Wildlife, North Bonneville, WA.

[2]Lisa Weitzel, U.S. Geological Survey, Western Fisheries Research Center, Seattle, WA.

[3]Bill Sharp and Sandy Pinkam, Yakama Nation Fisheries, Toppenish, WA.

[4]Rod French, Oregon Department of Fish and Wildlife, The Dalles, OR.

Appendix Table 2. Annual counts of adult sea-run coastal cutthroat trout migrating upstream and collected at Powerdale Dam fish trap (RKM 4.5) in the Hood River, OR.

Year	Cutthroat count	Reference[a]
1962	8	1
1963	27	1
1964	17	1
1965	27	1
1966	57	1
1967	101	1
1968	134	1
1969	177	1
1970	18	1
1971	45	1
(trap data on coastal cutthroat trout were not collected for years 1972 - 1991)		
1992	4[b]	3
1993	0	1
1994	0	1
1995	0	1
1996	0	2
1997	3[c]	3
1998	0	4
1999	0	5
2000	1	3
2001	11	3

[a]References:

[1]Newton, J. A., and S. Pribyl. 1996. Fish stock status review, Mid-Columbia Fish District, May 1-2, 1996. Unpublished StreamNet reference. Website accessed January 2002: http://www.streamnet.org/

[2]Anonymous. 1997. Mid-Columbia Fish District annual report to Oregon Department of Fish and Wildlife, StreamNet reference. Website accessed January 2002: http://www.streamnet.org/

[3]Olsen and French (2000).

[4]Newton, Jim. 1998. Mid-Columbia Fish District annual report to Oregon Department of Fish and Wildlife, StreamNet reference. Website accessed January 2002: http://www.streamnet.org/

[5]Pribyl, Steve. 1999. Mid-Columbia Fish District Annual Report to Oregon Department of Fish and Wildlife. StreamNet reference. Website accessed January 2002: http://www.streamnet.org/

[b]StreamNet reported 5 cutthroat trout were collected from Powerdale trap in 1992 (website accessed January 2002: http://www.streamnet.org/); while Olsen and French (2000) reported 4 cutthroat trout for 1992.

[c]StreamNet reported no cutthroat trout were collected from Powerdale trap in 1997 (website accessed January 2002: http://www.streamnet.org/); while E. Olsen, and R. French (2000) reported 3 cutthroat trout in 1997.

Appendix Table 3. Observations of upstream migrating, adult sea-run cutthroat trout at Bonneville Dam Adult Fish Facility. These observations come from by-catch data for coastal cutthroat trout, which are not consistently or deliberately collected at this location. Data provided by Charlie Cochran (Washington Department of Fish and Wildlife, North Bonneville, WA).

Date (m/d/y)	Life stage	Sex	Fork length (mm)	Comments
11/14/00	adult	male	410	chrome bright, possible hybrid, cutthroat trout spotting, faint slashes but short maxillary
11/20/00	adult	female	340	bright, almost ripe female
11/24/00	adult	unknown	330	bright, no sex recorded
12/8/01	adult	unknown	420	bright
12/13/01	adult	female	390	ripe female
1/7/02	adult	male	380	kelt, very beat up body and tail, fungus
1/22/02	adult	female	371	very ripe, no clips but substantial dorsal fin erosion-like unmarked hatchery steelhead

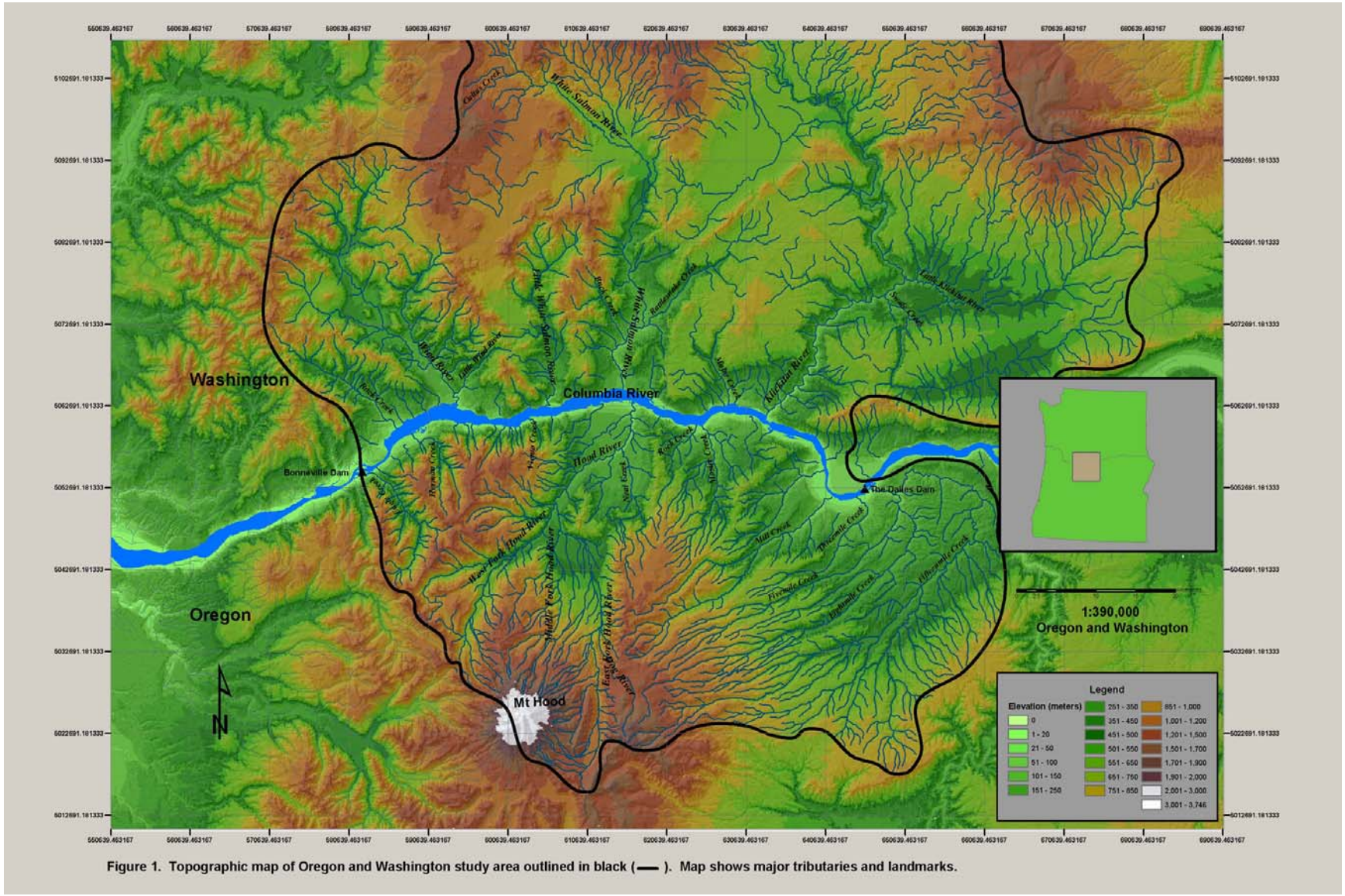

Figure 1. Topographic map of Oregon and Washington study area outlined in black (—). Map shows major tributaries and landmarks.

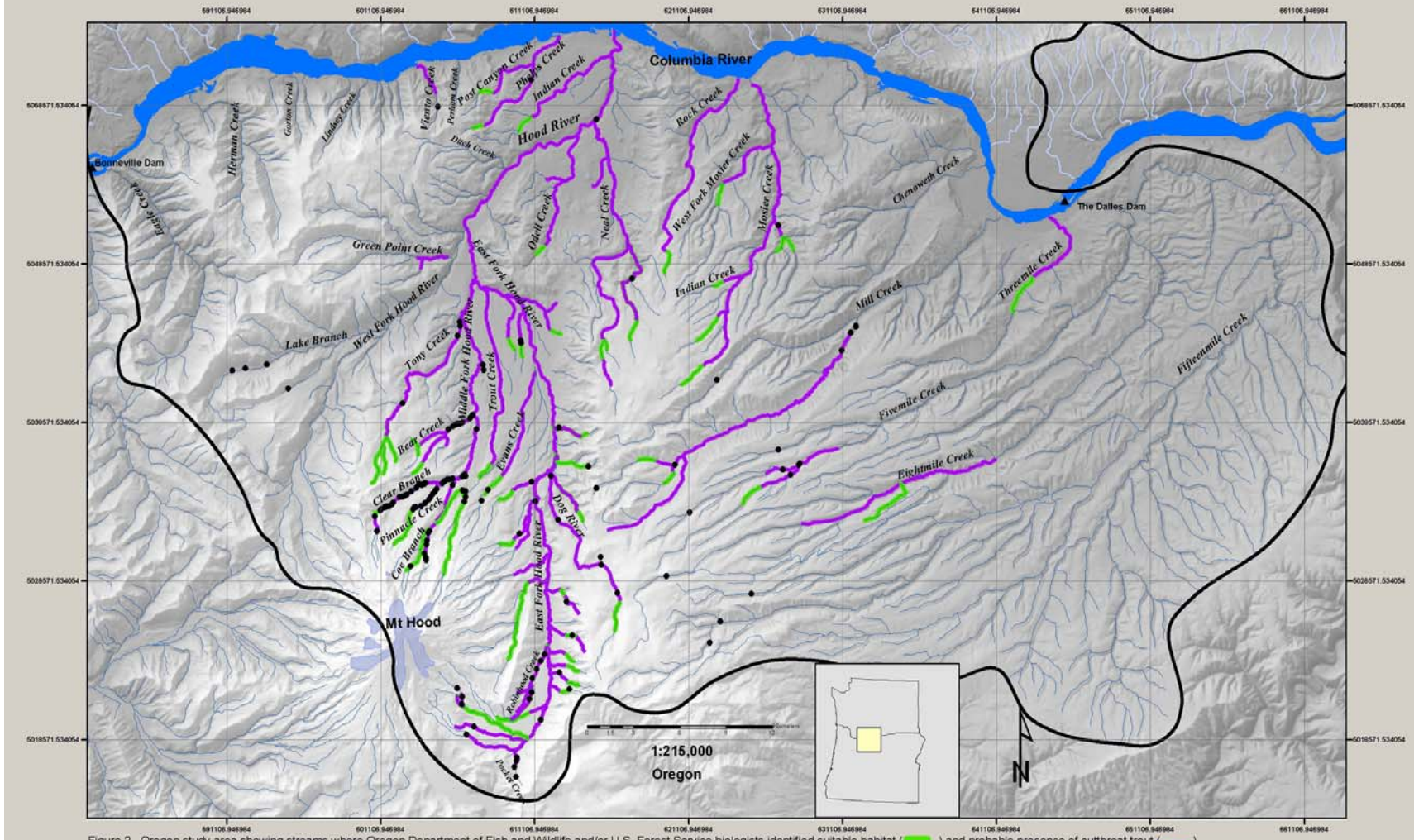

Figure 2. Oregon study area showing streams where Oregon Department of Fish and Wildlife and/or U.S. Forest Service biologists identified suitable habitat ( ) and probable presence of cutthroat trout ( ) on the Oregon side of the Columbia River. The study area boundary is outlined in black ( ). Locations where cutthroat trout were documented by biologists during aquatic sampling are marked with black circles ( ). Presence of cutthroat trout is unknown in unmarked stream sections.

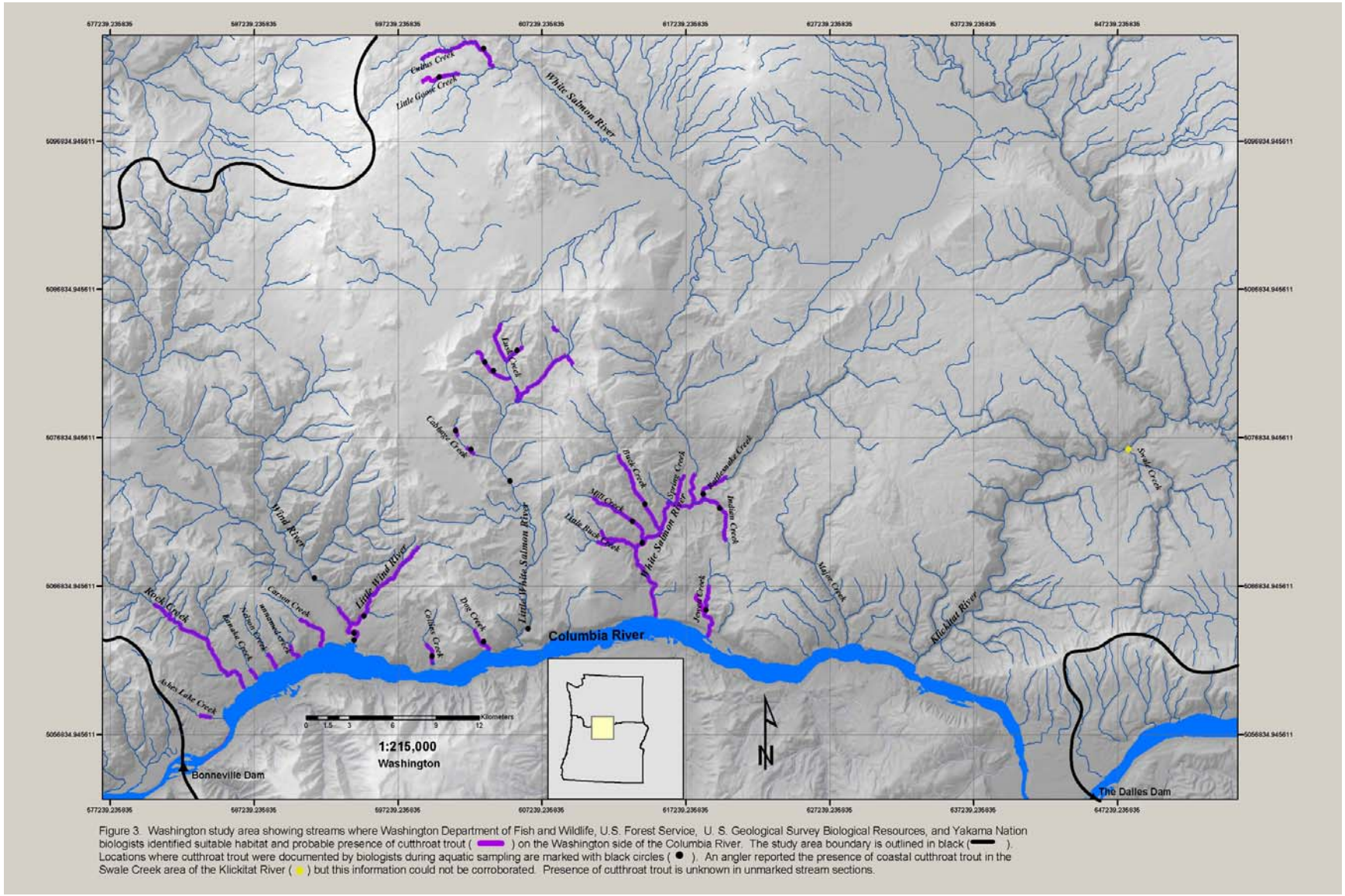

Figure 3. Washington study area showing streams where Washington Department of Fish and Wildlife, U.S. Forest Service, U. S. Geological Survey Biological Resources, and Yakama Nation biologists identified suitable habitat and probable presence of cutthroat trout (▬) on the Washington side of the Columbia River. The study area boundary is outlined in black (▬). Locations where cutthroat trout were documented by biologists during aquatic sampling are marked with black circles (●). An angler reported the presence of coastal cutthroat trout in the Swale Creek area of the Klickitat River (●) but this information could not be corroborated. Presence of cutthroat trout is unknown in unmarked stream sections.